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MINOR STUDIES FROM THE PSYCHOLOGICAL LABORATORY OF CLARK UNIVERSITY.¹

Made under the direction of
EDMUND C. SANFORD, PH. D.

VIII. A STUDY OF INDIVIDUAL PSYCHOLOGY.

BY CAROLINE MILES.²

Instructor in Psychology at Wellesley College.

Great as have been the contributions of the laboratory to recent psychology, many most fascinating and important problems as yet resist experimental solution. For the study of these the investigator is thrown back upon introspection and observation, and, so far as his introspection is to have extraneous confirmation, upon the questionnaire.

To ask questions is easy, but to make the questionnaire an instrument of precision is very far from easy. It has more ways of going wrong than the chronoscope, and is in as great need of careful study. To say nothing of the general difficulty of selecting truly cardinal points for questioning about, and the special rhetorical difficulty of framing questions that shall be perfectly clear as to the information required without at the same time prejudicing the answers to be received, there yet remains the difficulty of assigning their proper weight to the answers received. How much dependence, for example, can be placed on the inner observations of people of intelligence, but untrained in introspection? How fully does what can be recalled at the time of answering represent the total experience of the answerer on the matter in question? What allowance must be made for influences that might unconsciously mold the answers, — aversion to displaying anything of the inner life on one hand and egotistic interest in one's own experiences on the other, distrust of the questioner or desire to

¹ Continued from Vol. V, p. 389.

² Received as a private pupil during the winter of 1893-94.

stand well in his estimation? Some of these sources of error can be avoided, some must be recognized and allowed for and some must forbid the use of the method except under uncommon circumstances. On some of these points the questionnaires already put forth by various investigators have thrown light, and the following report of a study by this method is presented as much for what it may contribute to the psychology of the method as for the facts that were elicited by it.

The questions asked were as follows :

- A. (1) How do you know your right hand from your left? (2) Do you ever hesitate for a moment as to which it is? (3) Are there any two things that you persistently tend to confuse, such as *ei* and *ie* in spelling, or the Guelphs and Ghibellines in history? (4) Have you mastered any such tendencies and how?
- B. How do you recall a forgotten name?
- C. (1) How do you concentrate your mind with all your might on some one thing, *e. g.*, in playing the parlor game of "mesmerism"?¹ (2) How do you force yourself to work when you do not want to? (3) How do you pay attention to a dull lecture?
- D. How do you go to sleep when sleepless?
- E. (1) What things were you afraid of as a child? (2) Were you ever frightened by these things? (3) How did you overcome your fear?
- F. Mention a good ghost story, *i. e.*, something that gives you the creepy feeling supposed to characterize ghost stories
- G. Mention several concrete instances of things that have made you angry—ten if possible.
- H. (1) What is your favorite color, *i. e.*, what color appeals to you most apart from any colored thing—merely as color sensation? (2) Why do you like this color? (3) Has this color any association with persons, places, music, poetry, emotion, odor, taste?
- I. Did you express yourself in any art form before eighteen years of age?
- J. What were your favorite games when a child?
- K. (1) What is the earliest thing you are sure you can remember? (2) How old were you?
- L. Mention some story that has made you weep—the most pathetic you can think of.
- M. Mention a funny story, incident, joke or scene in a book or play—the funniest you know, if possible.
- N. What characters in history, fiction or life were ideal to you when growing up?
- O. If you had just one sermon to preach what would be your text?

These questions were asked of 100 Wellesley women during the winter of 1893-94. The persons were taken at

¹ This game has several forms and many names. The essential feature of it, however, is that one member of the company withdraws while the remainder select some object which he is to find or some act which he is to perform on his return. When he re-enters all of the company endeavor to assist him by intent concentration of mind on the object or act selected.

random and the number included seventy-one students and twenty-nine members of the faculty. At first the questioning was verbal and the entirely naïve answers were noted down by the writer. These results were then examined and two months later other questions suggested by them were added to the original set and a printed copy was sent to the same 100 persons with the request that new answers be written without regard to the former answers. Ninety-seven persons responded, and the following report is based on a tabulation of these written answers. Comparison with the first naïve answers has also been made when it promised anything of interest.

The questions were asked in irregular order, but will be discussed in five rough groups: I. Habits of Discrimination and Memory (*A* and *B*). II. Method of Concentrating Attention and of Getting to Sleep (Extreme Distraction of Attention) (*C* and *D*). III. Emotions and Preferences (*E*, *F*, *G*, *H*, *I*); *E* strictly belongs to group IV, but for purposes of comparison with *F* it has been placed as it stands. IV. Recollections of Childhood (*J* and *K*). V. Miscellaneous Questions More or Less Unsatisfactory (*L*, *M*, *N* and *O*).

I.

Habits of Discrimination and Memory.

A. (1) Question: How do you know your right hand from your left ?¹

Replies on second questioning (97 cases): Thirty-three (33) mentioned some association, such as writing or eating, the position of the heart, some actual difference in the hands, as a ring or scar, or the conditions in which the respondent was when she first learned her right hand. Twenty-seven (27) replied that there is a distinct difference in feeling, which they describe as readiness, skill or strength. Thirty-seven (37) called their method merely "instinct," and could not define the difference further.

Replies on first questioning (100 cases): Thirty-seven (37) mentioned an association, thirteen of them mentioning some actual difference in the hands. Thirty-three (33) said it was a feeling of difference, three stating that the difference extended to the whole side. Thirty (30) called it "instinct," or replied "because I was told," without further specification. The greatest change in the records of the two questionings is the decrease of those that tell by a feeling of difference and the increase of those that tell by "instinct."

¹ For this question the writer is indebted to Dr. Clarence Blake of Boston.

Such a change is not surprising considering the indefinite character of the feelings of difference reported, a difference in readiness is hardly to be distinguished from an instinctive difference in the loose way in which the word was used. The three persons that fail to appear in the second questioning belonged one to each class.

(2) Question: Do you ever hesitate for a moment as to which it is?

Replies on second questioning (97 cases): Fifty-seven (57) replied Never. Forty (40) replied Yes. This is probably too small a proportion for those liable to this confusion. Of the forty that replied Yes, nearly a quarter (9 — all students) gave such instances as drill and setting tables, as in Wellesley domestic work, but not all of the students questioned (71) had had drill or setting tables, and some therefore had missed these opportunities of finding their liability to confusion.

A comparison of the answers to (1) and (2) shows an interesting relation between the way of telling the hands and liability to confusion.

Of 33 who tell by association:	24 are sometimes confused.
Of 27 who tell by a feeling of difference:	10 are sometimes confused.
Of 37 who tell by "instinct:"	6 are sometimes confused.

This relation furnishes another evidence of the greater reliability of muscular as compared with associative memory, and of unconscious as compared with conscious memory of either sort. The difference, however, is probably a good deal less than the figures seem to show, for the persons that suffer confusion and so have to recall consciously which their right hands are would be on that account the more able to give a definite account of how they know, when presented with a questionnaire. Both tendencies work in the same direction: those that are uncertain are familiar with how they find out, and those that find out by conscious means are apt to be uncertain.

Of the 97 persons asked, 43 remember how they learned and 54 do not. Twelve now tell the hands by recalling the way in which they learned; eleven of these belong to the forty-three who remember and one, whose knowledge came in some other way, to those who do not remember.

The fact that the method of learning still persists as an association may be due to a very good memory or it may be due to learning very late. Nine of those who distinguish by an association mention learning after they started to school. The average age of the earliest memories (see question K below) of the two classes seems, however, to favor the former hypothesis. The age to which the earliest memories of those

who employ association belongs averages three years; that of those who know by instinct averages three years nine months; that of those who know by difference in feeling averages three years seven months.

The tendency to confuse the right and left hands called attention also to the tendency to confuse other pairs of things that have few points of difference or in which from any reason the distinction seems arbitrary.

(3) Question: Are there any two things which you persistently tend to confuse, such as *ei* and *ie* in spelling, or the Guelphs and Ghibellines in history?

Replies (97 cases): Seventy-five (75) were conscious of more or less tendency to confusion, some saying that they confused everything that could be confused. Twenty-two (22) were not conscious of any such tendency. The list of examples given by the seventy-five may be classified as follows, beginning with the most arbitrary distinctions: (a) *Spelling* and other confusions almost as arbitrary: *e. g.*, directions, turning a screw. Spelling, however, afforded most examples, such as double letters, *el* or *le*, *sion* or *tion*, etc. (b) *Words of similar sound* but different meaning: *e. g.*, statue and statute, Calvary and cavalry. (c) *Mathematical formulæ* which must be used in computations as words are used in sentences. These involve a train of reasoning too long to go through each time they are used, and are, therefore, distinguished arbitrarily in memory: *e. g.*, $\sin (x+y)$ and $\sin (x-y)$. (d) *Confusions in science*: *e. g.*, do acids or alkalis turn litmus paper blue? Of two organ pipes of the same length, which gives the higher note, the open or the closed pipe? These involve a process of reasoning, but it is not so long as the mathematical formulæ and is more concrete, so the memory can be aided by associations with experiments and by mental images. (e) *Confusions in history*: *e. g.*, did the Yorkists or the Lancastrians wear the red rose? Did Roger or Francis Bacon write the "Novum Organum?" With increasing knowledge of history these facts cease to be mere matters of memory and it becomes impossible to confuse them. Taking into account also the fact that the number of confusions decreases steadily from the most arbitrary to the least so, from spelling which has almost no necessary associations, to historical names which abound in them, the conclusion is obvious that the tendency to confusion varies inversely as the fullness and variety of the associations that are started by the ideas in question.

This list of things confused was further examined to find the nature of the confusions made by those who distinguish their hands in the three typical ways.

Of 33 who distinguish by association:

- 28 were liable to confusions of the sorts mentioned.
- 10 gave instances in classes (*a*) and (*b*).
- 18 gave instances in classes (*c*), (*d*) and (*e*).

Of 27 who distinguish by feeling:

- 13 were sometimes confused.
- 9 in spelling.
- 4 in other cases.

Of 37 who distinguish by instinct:

- 24 were liable to such confusions.
- 21 in spelling, class (*a*).
- 14 in classes not purely arbitrary, (*c*), (*d*) and (*e*).

The first and third of these groups seem to show that the instinctive method of deciding is less valuable in the later acquired forms of discrimination. This agrees with the general biological principle that instinctive action proves valuable in relatively simple conditions to which the organism is well adapted, but must be replaced by conscious action when the conditions become complex and adaptation less perfect. Most of those who have *no* confusions are among the class who distinguish their hands by a difference in feeling, who, perhaps, carry spelling and formulæ and even historical associations in motor terms.

(4) Question: Have you mastered any such tendencies, and how?

Of 68 who answered this question:

- 29 employ an arbitrary association.
- 15 employ reasoning, *i. e.*, they think of the meaning of two terms or the derivation.
- 6 use arbitrary memory—some call it sheer force of will, others strain of attention, with some it becomes positive muscular strain.
- 18 have not succeeded in mastering their confusions.

A comparison of the records of the first and second questionings for questions (3) and (4) shows that fifteen persons find new confusions and seven omit old ones; and that nineteen seem to have changed their method of mastery, eight find arbitrary memory unsuccessful, seven find confusion not overcome, four are scattering—rule instead of arbitrary memory and *vice versa*.

B. Question: How do you recall a forgotten name?

Replies on second questioning (97 cases): Eighty-eight (88) recall by some sort of association. Two (2) are conscious of a strain toward vacancy. One (1) calls up a mental image of the name [tries to visualize it?]. One (1) is unsuccessful by any method, and five (5) cannot tell how they recall a name. A further classification of those that work by an associative clue, gives the following results:

Of 88 making use of some sort of association:

51 seek by association with the person to whom the name belongs, the circumstances under which it was first heard and the like.

24 by the initial letter, or the place on the roll.

12 by the sound of the name.

1 by some peculiarity of the spelling.

It seems probable that the common habit in trying for a lost name is first to recall the image of the person whose name it is, or the circumstances in which the name has been heard, or some other complex image in which the name is a part. This may happen almost unconsciously. If this method fails, appeal is made to some one of the more conscious methods, in which attention is directed to some remembered part or mark of the name, in the hope that this will bring up the rest. The fifty-one above make use of the first method, going from whole to part; the remaining thirty-seven use the more artificial method and go from part to whole.¹ The initial letter is apt to be the part recalled both because of its prominence as a capital letter and because of its being the first in the series that make up the name.²

The chief difference between the records on this point, in the first and second questionings, is the decided gain in the group that makes use of the first method. In the first questioning the groups were nearly equal; in the second, a small class who had depended upon some peculiarity of the leading consonant or vowel, length, rhythm, color or a vague indefinable feeling of recognition, almost entirely disappeared into the class that recall by association. This change may very likely have been due to better observation on the part of the answerers, induced by the attention which the first questioning called to the matter. It may also have been due to a disinclination to specify particularly a second time.

II.

Methods of Concentrating Attention and of Getting to Sleep.

C. (1) Question: How do you concentrate your mind with all your might on some one thing, *e. g.*, in playing the parlor game of "mesmerism?"

The naïve answers on this point in the first questioning were of three types:

¹It has already been found in association experiments that transition from whole to part is more frequent and probably easier than transition in the contrary direction. (Cattell and Bryant, *Mind*, Vol. XIV, 1889, p. 241.)

²Experiments on memory span have showed the superior persistence of the first member of the series used: *cf.* Bolton, this JOURNAL, Vol. IV, p. 378 f.

(a) Those who were conscious of some physical strain which aided in concentration, *i. e.*, a feeling of exerting will-power in mentally repeating the command "Do so-and-so;" or a tension of the vocal organs in repeating over and over the names of the single object which the "mesmerized" person is desired to find; or a tension in the head, or an effort to keep the body quiet.

(b) Those who are more conscious of a mental image of the object or of the act to be performed. A few see the object in all its parts or relations, and one sees the word.

(c) A very small class are conscious of auditory sensations, *i. e.*, they hear the word, either with or without repeating it.

A few others can give no idea how they do concentrate.

The written answers of the second questioning confirm this result, but the first class is much larger than the others. Repetition seemed clearly a means of concentration. The third class almost entirely disappears, and the number of those who cannot tell increases.

(2) Question: How do you force yourself to work when you do not want to?

Replies on first questioning (100 cases): Sixty-one (61) think of the end to be attained, duty to self or to some other person, the necessity of getting done promptly, consequences of doing or leaving undone. Twenty-four (24) mentioned some physical device, *e. g.*, sitting up straight, reading aloud, reading over and then stopping to repeat, or some bodily comfort conducive to "cramming." Fifteen (15) could say only "I just go to work."

The sixty-one give the usual testimony as to voluntary attention; in forced work the present physical discomfort is hidden by the pictured future happiness or unhappiness. It also appears that, when duty and inclination conflict, the fear of evil consequences is a more powerful, or at least a more frequent, motive than the hope of good to be attained.

Replies on second questioning (97 cases): Forty-five (45) mention duty, necessity, fear of consequences, three thinking of the object of the work and one of the reward. Twenty (20) speak of physical tension. Eighteen (18) have some special method of going to work, and fourteen (14) cannot tell.

Among the methods mentioned are: Close attention to details, removal of all external distractions, reading aloud, timing one's self, not allowing one's eyes or hands to wander, feigning an intense interest, and imagining one's self another person who is not tired or who wants to work. One speaks of artificial stimulation with coffee.

(3) Question: How do you pay attention to a dull lecture?

Results of second questioning (96 cases) : Sixty-four (64) have some conscious method. Ten (10) think of losing an opportunity, of politeness, etc., *i. e.*, make listening a matter of conscience. Five (5) feel physical strain. One (1) never finds a dull lecture, and sixteen (16) do not listen if they find one.

The answers to this question bring out another phase of attention. Not physical strain, nor moral consciousness is prominent, but the means of getting hold of the subject-matter that is presented. The number of those who do not listen includes ten members of the faculty who are, of course, beyond the stage of compulsory attention to dull lectures and sermons. The smallness of the number of students remaining is doubtless due to the fact that the question was explained to mean: How do you pay attention to something you are to be examined upon hereafter?

A classification of the methods employed by the sixty-four who have conscious methods gives the following table :

Of the 64 that have some conscious method:

- 16 pay close attention to the words, repeating them after the speaker if necessary.
- 14 feign an interest. This includes taking the attitude of interest.
- 12 make an outline. Some mentally, some on paper.
- 11 look steadily at the speaker.
- 6 assume a critical attitude.
- 4 try to get into rapport with the speaker.
- 1 imagines each sentence is the last.

Two things are strongly marked in this table. The first is the appeal from the sensory and receptive functions to the active and more directly controllable motor functions, from simple hearing to repeating of the speaker's words, the taking of an attitude of interest, the formation of an outline. The second is the turning to details, to the relatively concrete, either in the sensory form of the individual words or sentences of the speaker or his person (groups of 16, of 11, and of 1) or in the more intellectual forms of the outline and the critical attitude. The fact, also, that attention can be encouraged by feigning interest is worth regarding, not only for its implications as to the nature of emotions in general, but also as a contribution to mental tactics. All of the methods, however, probably involve more or less fully both the mental and the physical attitudes of attention.

A comparison of the answers to questions (1), (2) and (3), received at the first questioning with the later written answers, shows in (1) more consciousness of physical strain,

and in (3) more discovery of method. In (2) there is little difference, the changes balancing each other.

D. Methods of Getting to Sleep.

Question : How do you go to sleep when sleepless?

Replies on first questioning (100 cases) : Seventy-seven (77) report some method, twenty-three (23) report none (twelve because they are never sleepless and eleven because when they are sleepless no method succeeds).

Of 77 who report methods, 9 mention a physical method; 68 are mental and are as follows:

- 19 try counting.
- 10 repeat poetry.
- 8 have various methods of thinking of nothing.
- 6 feign the state of sleep.
- 4 make up stories.
- 4 imagine that they are rocking on the ocean.
- 4 try to think of something pleasant.
- 3 imagine sheep going over a stile.
- 2 make pictures of peaceful or monotonous scenes.
- 2 try to think of something dry [uninteresting].
- 2 confine attention to some one thing.
- 1 listens in imagination to a brook she has often heard when going to sleep.
- 1 listens to the ticking of her watch.
- 1 repeats the Greek verbs.
- 1 counts her breaths.

Many had more than one method, and many mentioned both physical and mental methods.¹

In the first questioning there was also no report as to whether the answerers were troubled by sleeplessness or not. The printed questions asked for physical and mental methods and added : Are you often troubled? The replies (97 cases) showed twenty-two (22) who were often sleepless, nineteen (19) who were rarely so, fifty-six (56) who were never so. A further classification of the methods employed by these different groups gives the following table :

Of 22 who are often sleepless:

- 6 find a physical method more successful, *e. g.*, more fresh air in the room, eating, lying on the chest, perfect relaxation, etc.
- 4 must get up to read awhile.
- 3 count.
- 3 repeat something.
- 1 imagines humming sounds.

¹Compare the list which Wordsworth gives as ineffectual in his sonnet on "Sleeplessness."

"A flock of sheep that leisurely pass by
One after one; the sound of rain and bees
Murmuring; the fall of rivers, winds and seas,
Smooth fields, white sheets of water, and pure sky:
I've thought of all by turns, and still I lie
Sleepless:"

- 1 imagines an agreeable company.
- 4 are not successful by any method.

Of 19 who are rarely sleepless:

- 4 try counting.
- 2 have methods that suggest hypnotism, following an imaginary line up and down or watching a mental image of interweaving lines and concentric circles.
- 1 reads.
- 1 repeats something.
- 1 performs a simple arithmetical problem.
- 1 is unsuccessful.

The other 9 try stories, air castles, imagining the influence of ether, or merely anything pleasant, only one mentioning a real physical method; the others seeming to be merely memories of how it is to go to sleep.

Of 56 who are never sleepless:

- 9 think of nothing.
- 7 mention physical relaxation.
- 7 count.
- 7 think of something pleasant.
- 3 repeat something.
- 10 have no conscious method.

The other 13 have methods which are special instances of thinking of something pleasant, but involve regularity of movement, or simple mental imagery.

The writer's conjecture, formed after examining the first collection of methods, that the best of them is the feigning of sleep (chiefly a physical method) was confirmed by the relative frequency of physical methods among those that are really sleepless. Counting, repeating poetry or Greek verbs, rocking on the ocean, listening to a watch or to the imaginary sound of a brook, while they are rhythmical and would go with regular breathing, seem to imply a little more attentive activity for their execution. Those who make stories or pictures, or think of something dry, or concentrate attention on some one thing, seem to feign dreaming or to remember the semi-conscious reverie that precedes falling asleep. This also is confirmed by the classification, for such methods are tried by those rarely or never sleepless. Both these methods and the feigning of sleep proceed on the psychological principle that a given mental state will tend to reproduce itself entire when enough of its constituent parts are reproduced.

Of the psychical causes of sleeplessness the chief is inability to cease thinking about what has engaged the attention before going to bed; it is a "cramp of attention." The great art in getting to sleep on the other hand is the art of attending to nothing, the art of general distraction of attention. This makes the methods employed in getting to sleep an interesting counter picture of the methods of concentrating attention in study or on a dull lecture. In the first there is general

passivity, in the second activity. To attend, the muscles are contracted and an erect posture is assumed, explicit movements are made (reading aloud and repeating what has been gone over, making notes of what is said by the lecturer); to get to sleep, the muscles are relaxed, a recumbent position is taken, movements are avoided or suppressed (the counting or reciting poetry is generally silent or semi-articulate). In attending, the effort is to establish trains of thought connected with the matter in hand (making outlines, taking a critical attitude, looking steadily at the speaker, and trying to put oneself into rapport with him); in getting to sleep, the effort is to establish trains unconnected with the intrusive thought (reading, counting, reverie, repeating poetry or verbs). Over against the tendency to concentration on details in the first may be set in the second the tendency to rhythm (which gathers particulars into groups), though rhythm has a yet stronger reason for its presence in that it reduces the demands on attention to a minimum. In the first, future consequences are a spur, in the second everything but the present is excluded; and further instances would be easy to find. The contrast, however, is not absolutely perfect, and there are even points of identity, because, while attention is concentration as opposed to general distraction, it is itself distraction from everything except the thing attended to. In attending there is the exclusion, so far as possible, of sensations unconnected with the matter in hand, in getting to sleep the exclusion of all sensations; in attending the more or less complete suppression of non-assistant movements, in getting to sleep the suppression of all movements. Both are sought by imitation of the characteristic attitudes of mind and body.

A comparison of the results of the first and second questionings as wholes shows that in the two months that intervened physical methods had in six instances proved more successful than mental; in four instances building air castles, imagining something pleasant, etc., had proved better than no method; in four other instances reading, physical relaxation, etc., had proved better than counting; two persons had found no method successful.

III.

Emotions and Preferences.

E. (1) Question: What things were you afraid of as a child?

The answers received on the second questioning are classified in the following table. The number of things feared

exceeds the number of persons questioned, because most persons who confessed to any fear confessed to more than one.

Classification of things feared:

- 31 feared darkness.
- 31 feared animals. Dogs and cows were mentioned most often, geese and turkey gobblers several times.
- 24 feared a class of creatures which many of them said caused repulsion rather than fear, *e. g.*, snakes, spiders, worms, mice, cats, etc. Many in this class seemed abnormally fearful, and were terrified, also, by floating feathers, tearing cloth, and by all white, fuzzy things.
- 18 feared human beings—drunken, dead, insane, strange tramps, and rude boys.
- 9 feared imaginary evils, *e. g.*, witches, Satan, the end of the world, being buried alive, earthquakes, nightmare.
- 3 spoke of thunderstorms or of all strange noises.
- 2 were afraid of everything, one of whom was sure it was due to a prenatal influence.
- 6 were afraid of nothing.

Taking the list as a whole it is easy to trace in it two types of fear, the artificial fears induced by painful experience or the suggestions of elders, and the instinctive fear of the unknown. From the latter type, perhaps, ought to be separated yet a third, namely, fears that arise reflexly on sense impressions of special kinds, especially voluminous sensations. Examples of this would be the fears of snakes, spiders and insects and of fuzzy things, so far as these are tactual, the fears of tearing cloth, of thunder and other loud noises, and perhaps in some cases the fear of darkness—probably the most voluminous visual sensation in the experience of a child.¹ These are, however, at first all more or less strange experiences and later are seized upon by suggestion, so that in any individual case classification would be difficult, if not impossible. In the more conscious fears there is a common

¹The following extract from the autobiography of Laura Bridgman seems to show something like an instinctive touch-fear, though, of course, strangeness was also a factor. The experience belongs to a time before her eighth year, and so, before means of communicating with her had been secured. "My father used to enter his kitchen bringing some killed animals in, and deposited them on one of the sides of the room many times. As I perceived it, it made me shudder with terror because I did not know what the matter was. I hated to approach the dead. One morning I went to take a short walk with my mother. I went into a snug house for some time. They took me into a room where there was a coffin. I put my hand in the coffin and felt something so queer; it frightened me unpleasantly. I found something dead wrapped in a silk handkerchief so carefully. It must have been a body that had had vitality. I did not like to venture to examine the body for I was confounded. There stood some person on one side of the floor very calm, gazing upon the dead, and they touched its clouded eye and stroked it as if the tears were shedding along his face."

element of helplessness, in the dark one is robbed of his chief sense; ghosts, witches, Satan, represent an unknown and invisible power; earthquakes and the end of the world are catastrophes against which no power is availing.

The answers received on this head in the first questioning were unreliable, because the respondents did not at once recall the things they feared most, and those of the second questioning have alone been regarded in this discussion.

(2) Question: Were you ever frightened by these things?

This question might be expected to decide in individual cases whether the fear was acquired by personal experience on the one hand, or by instinct or suggestion on the other. The answers to this question were inconclusive, about as many fears of each kind appearing in the lists of those who had not been actually frightened by them as in the lists of those who had.

(3) Question: How have you overcome your fear?

Most of those who had not actually been frightened spoke of the fear as outgrown. A large class still feared snakes, insects, cows, horses, drunken and insane people. A few said they reasoned themselves out of it; one said pride overcame it, another, that better health caused it to disappear naturally. Much the greater number of fears caused by actual fright had not been overcome; repulsive things formed the largest class of these. Twice as many childish fears persist when caused by fright as when no cause can be remembered and they are believed to be instinctive.

F. Question: Mention a good ghost story, *i. e.*, something that gives you the creepy feeling supposed to characterize ghost stories.

Replies on second questioning (97 cases): Eighty (80) told stories which they thought creepy. Twelve (12) could tell none, were not sufficiently impressed to remember them. Five (5) told stories with a humorous turn at the end, which seemed to be the thing for which they were remembered, not for the mysterious part. The stories mentioned were all read to find the element which gives the creepy feeling. Many, of course, involve several elements of the fearful, but such a classification of elements as can be made gives the following table:

Of 80 stories which were thought creepy:

32 involved something unexplained, *i. e.*, one-third of all the replies were real ghost stories.

22 were stories of insanity.

16 were stories involving moral horror, as well as other sorts of fear, *e. g.*, Dr. Jekyll and Mr. Hyde.

10 were stories of murder, torture, snake stories, or stories about finding a corpse unexpectedly.

While none of the categories under *F* exactly match those of *E* and while *F* asked for stories of one kind of fear only, some general points of resemblance are interesting. The stories of murder, torture, snakes, and the like in *F*, are analogous to the sense fears in *E* and perhaps depend more immediately on sense imagery for their effect than the others. Stories of insanity and the fear of the insane are of common origin. The real ghost stories involve darkness and its fears together with those of the unknown and of mysterious power. An entirely new kind of fear appears in the moral horror group, a mark perhaps of the adult audience for which such stories are written. The feeling inspired by "Dr. Jekyll and Mr. Hyde," or by Mrs. Shelley's "Frankenstein," swallows up the mere physical sensations and makes them instruments of a moral repulsion. Hyde's external appearance and his crimes are repulsive to contemplate, but the story means little to him who sees only the bare incredible facts. Ibsen's "Ghosts" is repulsive as any idiocy is repulsive, but there is more than mere idiocy, there is awe before the forces of nature which make sin its own punishment. This is like the fear of darkness in that it is individual helplessness, but it is much more complex. It includes many kinds of sense-fears plus associations with moral ideals that do not exist for the young child. The ghost stories that affect one most are those in which there is a skillful accumulation and interweaving of all sense-fears. Among these ghost stories Poe's tales, Lytton's "The House and the Brain," and a story, originally from the German, called "The Gold Arm," were mentioned equally often. Stories of being watched by a pair of eyes peeping through a rent in a curtain or a crack in the floor received the next highest number of votes, and after them a story in *Harper's Magazine* for 1859, called "What was It?" An examination of the plots of these stories shows most interestingly how the artificial fear is worked up; fears of the sense types are common but generally subordinate, the fears of others are described and excite our own by sympathy or imitation, the whole scene of the story is gradually shifted from the ordinary world of daylight and known forces to a world in which man is the sport of mysterious and unknown powers. The appeal to the senses is never to all at once; a presence can sometimes be felt but not seen, sometimes seen or heard but not touched; sometimes it is only the effects of its acts which appear. The actual shudder of fear is generally the result of a special sensory appeal.

G. Question: Mention several concrete instances of things that have made you angry—ten if possible.

In order to secure a large number of answers no time of life was mentioned and thus the instances extend from childhood to the age of the average Junior in college. Those who wished to respond kept asking: "Do you mean vexed, or indignant, or simply *mad*?" The latter definition was adopted because it seemed least likely to be misunderstood. Of 100 persons asked only 34 gave lists of things that had made them "*mad*."¹ These lists included 247 instances of anger, but thirty-two instances were duplicated in the same list, *i. e.*, the same person unconsciously gave two or more instances when the cause was the same in both. The instances duplicated were as follows: Seven gave more than one instance of being angered by punishment; four by punishment because it was thought unjust; six by reflections (slurs) upon family, friends, country, etc.; five by arbitrary compulsion; two by pride in personal appearance; two by meddling; two by inanimate things; one by false accusation; one by carrying off of property. A classification of the 215 single instances remaining gives the following table:

Of 215 single instances of anger:

78 were due to causes which the writer cannot better name than injuries to sense of personal dignity; seventeen, remarks more or less insulting to members of one's family, dear friends, sex, church, or political party; sixteen, punishment, including scolding, punishment that was administered in the presence of others, etc.; seven, interference in one's personal affairs, *e. g.*, religious beliefs or friendships; six, being laughed at; four, being slighted; four, making a bad appearance in recitation; three, not being told what one thought she ought to know; two, being patronized; two, being gossiped about; two, being made a tool of; two, having manners corrected; two, comments on personal appearance; the rest of the seventy-eight are isolated instances, such as being told, "I told you so," having work taken out, etc.

73 are caused by sense of injustice;

41, injustice to self: twelve, unjust punishments; eight, when someone shirks her duty; seven, being contradicted—including positive accusation of falsehood; five, a broken promise; two, having to spend more time on lessons than seems just; one, being willfully misrepresented; one, being interrupted; one, not being allowed to explain; one,

¹ The smallness of this proportion is doubtless due in part to the difficulty of recalling things that have caused anger (normal people put such unpleasant things out of mind and in time forget them) and in part to disinclination to confess those that are recalled. The question is emphatically condemned as a question by this small number of answers and except for the goodly number of instances cited by the third that did respond would have hardly been worth discussing.

- being cheated out of something; one, being left at home; one, not being sympathized with; one, when matters serious to her were made light of.
- 17, injustice where self is not involved: eight, seeing someone else punished unjustly; four, hearing some one unjustly criticized; three, seeing animals ill-treated; one, seeing good nature imposed upon; one, seeing one person tell on another.
- 15, injury to property: eight, interference or injury to property, *e. g.*, having a notebook carried away; five, when a journal or letter was read; two, when a pet was killed.
- 33 were arbitrary compulsion, *i. e.*, to do one thing when she preferred to do another, or to refrain from something, or simply to "do as you are bid," *e. g.*, to do some kind of domestic work, to practice music, to apologize, not being allowed freedom to do work in one's own way.
- 25, physical annoyances: ten, being teased; three, "the mere sight of some people;" two, hurting one's self; two, familiarity from some people; two, having one's hair combed. Other examples are: pianos out of tune, being pushed in a crowd, being kept awake at night, etc.
- 6, disappointment, *e. g.*, not being able to learn something, or to find something when it is wanted, or missing a train.

Such a table as this, based on answers from only about one-third of those asked, can furnish only the most general indications, but there are traces of a few relations that are, perhaps not entirely accidental. The preponderance of mental and moral causes is clear and to be expected. The extent to which offences against personal dignity appear (and to the seventy-eight specified in the table should surely be added a large portion of the cases of injustice to self and of arbitrary compulsion) is doubtless characteristic of the angry emotions of people generally, and is not without pedagogical and ethical import. The small number of cases in which the anger was altruistic, testifies to a healthy egoism; we may be indignant at injuries to others, but our feeling rarely rises to anger unless others stand near enough to us to be covered by the *égoïsme à deux* by which a certain Frenchman has described love.

H. (1) Question: What is your favorite color, *i. e.*, what color appeals to you most, apart from any colored thing—merely as color sensation?

Replies on first questioning (100 cases): Thirty-eight (38) prefer some kind of blue; eighteen (18) some kind of red; twelve (12) yellow; eight (8) green; five (5) violet; one (1) white; one (1) dark brown; one (1) all dark warm colors; one (1) mere brightness of evening sky; and fifteen (15) have no preference.

Replies on second questioning (97 cases): Thirty-seven (37) preferred blue; twenty-two (22) red; ten (10) yellow;

nine (9) green; five (5) violet (heliotrope, lavender, purple); two (2) brown; two (2) gray; one (1) white; one (1) brightness of the evening sky; one (1) all dark warm colors; and seven (7) had no preference.

Blue is clearly the most generally preferred color and red stands next; after it follow yellow, green and violet. The most noticeable difference between the results of the two questionings is the decrease of those who have no preference and the gain of those that prefer red.

This order is confirmed by the report from a psychology class, each member of which was asked to write her favorite color on a slip of paper before leaving the room. This class of twenty-one reported as follows: Ten blue, four red, two none, one yellow, one gray, one violet, one green, one white.

Another class of forty-six was asked suddenly to put down the first color that came into their minds. Of forty-six persons: Nineteen wrote red, fifteen wrote blue, five wrote yellow, four wrote white, one wrote green, one saw the whole spectrum beginning with red, one saw a band of four colors beginning with red.

The explanation of color preferences was sought by asking the second question.

(2) Question: Why do you like this color?

In the first questioning:

Of 38 (blue): 30 give a reason.

Of 18 (red): 16 give a reason.

Of 12 (yellow): 10 give a reason.

Of the smaller classes all can tell why, and the reasons are most elaborate for the most unusual colors.

In the second questioning:

Of 37 (blue): 29 can give some reason.

Of 22 (red): 19 can give some reason.

Of 10 (yellow): 8 can give some reason.

Of 9 (green): 8 can give some reason.

All after green as before.

From this it appears that in both cases red has more conscious meaning than blue or yellow. The reasons given for liking blue are, delicacy, purity, tenderness, spirituality, infinity, calmness, faithfulness, immortality. Red is chosen because it is warm, deep, cheerful, loving, intense, passionate or quivering with pulsating life. Reasons vary in both cases with the shade chosen. Yellow is chosen for warmth, softness, happiness.

(3) Question: Has this color any associations with persons, places, music, poetry, emotion, odor, taste?

In the first questioning:

Of 38 (blue): 26 have some association.
 Of 18 (red): 10 have some association.
 Of 12 (yellow): 9 have some association.
 All after yellow have some association.

In the second questioning :

Of 37 (blue): 26 have some association.
 Of 22 (red): 13 have some association.
 Of 10 (yellow): 6 have some association.
 Of 9 (green): 7 have some association.

Blue is most associated with the sky, then with memories of childhood, with the sea, with music, and all the gentler feelings. Red is associated with strong feelings, strong characters, autumn, martial music. Both are frequently associated with persons. Yellow is associated with flowers and sunshine.

The conscious reasons are relatively more numerous in the case of red than in that of blue, but the explicit associations are less so. This would seem to mean, if the figures will bear any interpretation, that red is a color of somewhat more direct emotional meaning, and blue of somewhat more indirect meaning. The "direct meaning" of any color is probably dependent on early and forgotten association, and the indirect on later and better remembered association. If this is the case the direct emotional meaning of red would probably be a trace of the supposed preference of very little children for that color. How much the answers are influenced by such expressions as "true blue" would be hard to say, but there is not much trace of it in the "reasons" and "associations" specified. Early habits of dress may count for a good deal (more children seem to be dressed in blue than in red), but this still leads as a problem why mothers choose blue.

I. Question: Did you express yourself in any art form before eighteen years of age?

Replies on second questioning (97 cases): Sixty-six (66) Yes; thirty-one (31) No. Two (2) used some form or forms, but do not say which. A classification of the forms used by the sixty-four remaining gives the following table:

Of 64 who made use of some art form:

- 14 used verse (alone).
- 10 used stories (alone).
- 6 used drawing or painting (alone).
- 4 used music (alone).
- 14 used stories and poetry.
- 3 used stories and drawing or painting.
- 3 used poetry and drawing or painting.
- 2 used poetry and music.
- 1 used painting and music.
- 6, all arts but music.
- 1, all arts but painting.

Those who replied No seemed to take pride in the fact that they had been guilty of no such youthful folly. Most called their poetry rhymes. No attempt was made to get possession of the productions, but information was volunteered in some cases. Most interesting was one who wrote a tragedy at ten, which was acted on a little stage for the benefit of her friends; from ten to thirteen, an epic; at thirteen, sentimental and religious poems. A few mentioned telling stories as a favorite pastime, but said they did not write them down. A few mentioned a full journal as one means of expressing feelings from about twelve to fifteen. A few more who were asked in general conversation, said their poetry was religious and their stories sentimental—often involving their idealized selves as heroines.

IV.

Recollections of Childhood.

J. Question: What were your favorite games when a child?

The list of games falls easily into active, imitative and competitive groups. Classifying in that way gives the following table:

Of 92 who replied:

- 49 gave active games (including those of competitive activity):
 - 31, running and being pursued; specifically: sixteen, hide and seek; six, all running games (none named); four, tag; chase, London bridge, pussy wants a corner, blind-man's buff, fox and geese, hop-scotch, mulberry bush, wild Indians, etc.
 - 13, mere activity (?): horse, all boys' games, all out-door games, climbing trees, riding horseback, swinging, etc.
 - 5, games involving more thought: four, ball; one, hunt the thimble.
- 36, imitative games: thirteen, dolls; twelve, dramatic plays (invented from stories); four, keeping house; four, school; two, building bridges; one, church.
- 7, competitive games (involving thought): three, checkers; two, dominoes; two, puzzles.

Evidently far the larger number preferred out-door games, and among these most prefer the excitement of chasing and being chased. Hide and seek is the most popular game of all. Dolls come next in order—imitation of family life next after desire for pure activity. After these two games the remaining active and imitative games are almost exactly equal in number. In all cases where a number of games were mentioned the one given first was taken as that preferred.

K. (1) Question : What is the earliest thing you are sure you can remember ?

The replies on the second questioning (97 cases) may be classified as follows :

Of 97 who answered:

- 17 remember a birth or death in the family;
- 14 remember being frightened or hurt, *e. g.*, falling down stairs, being stung by a bee, being bitten by a dog, being punished, getting fingers pinched, feeling pain in eyes from flashes of light through the windows of a railroad coach.
- 12 remember an illness of self or family.
- 10 remember an emotion; of these, three remember a feeling of grief or disappointment at the death of a pet animal, when parents started to the Centennial, when a necklace was stolen; one remembers a feeling of anger, and two remember the feeling of pleasure on receiving a present.
- 9 some novel experience which seems to contain an assertion of individuality or at least a recognition of self as acting independently, *e. g.*, going to Sunday school alone for the first time, walking across the floor the first time, the first sentence, running away, or acting upon a new idea strictly her own, such as dressing up a dog or trying to make a chicken swim.
- 7 something connected with grandparents.
- 2 remember a visit. These might be regarded either as belonging with the development of individuality or with the memory of new scenes.
- 1 remembers her father's singing.
- 25 remember particular scenes which do not fall into any of the arbitrary classes above. Of these:
 - 12 have central figures, *e. g.*, a Christmas tree, a fire, a horse and carriage, Barnum's giant, a colored man, a sword, a kitten, a chicken, a new bridge.
 - 5 have no central figures but consist of a number of sense impressions, *e. g.*, scenes at the Centennial, playing in the garden, the family moving, a wedding.
 - 5 while remembering scenes do not specify one above the rest.
 - 3 cannot select any memory as the earliest.

Taking the table as a whole several tendencies appear. The preponderant direction of the mind of the child is shown by the fact that seventy show attention to the outside world and only twenty-seven to self. Even when the child thinks of himself he is more apt to regard himself as a victim of sensations than as an agent in bringing things to pass; in the twenty-seven cases only eight are of self assertion. Two cases of self-discovery are interesting enough for specific mention. One respondent remembers sitting on her mother's lap and hearing her mother explain to someone that she must postpone a journey because her little daughter was ill. This gave her a queer feeling of self recognition. The other says I remember "standing in the middle of the floor in the back bed-room and thinking that I was one of the people like those

around me and not just looking on at the world." The ages in these two cases were respectively three years and between two and three years.

A superficial examination of the table seems to show that the child's world is a world of sensations rather than feeling (only five cases of emotion are specified) and chiefly of sensations of sight, but this is undoubtedly an error, for an emotion of some sort is evidently what made the experiences originally impressive. If in this later conscious recall sense elements predominate, it is because emotions are themselves not clearly attended to at the time they are experienced and not well recalled afterward. A child that is in terror of a dog is attending much more to the dog than to his own fears. The difficulty of recalling emotions has been fully recognized by psychologists. The preponderance of visual recollections may be due to a similar cause; sight is for most people the leading sense and, other things being equal, the focus of attention is turned upon what is seen. An interesting illustration of this general relation is found in the memories of illness where the things specified are the darkened room, the taste of the medicine, the candle lighted in the night, the mother's face bending over the sick child or the father's voice as he carried it, while the pain itself is not mentioned. The memory of pain, like that of emotion, is extremely colorless and imperfect.

(2) How old were you ?

To this question eighty-nine replies were received, and the average was found to be 3.04+ years.

The different groups average as follows :

Memories of illness,	-	-	-	2.9+	years.
" " grandparents,	-	-	-	2.6+	"
" " birth or death,	-	-	-	3.3+	"
" " being hurt or frightened,	-	-	-	2.8+	"
" " special scenes,	-	-	-	3.1+	"
" " emotions,	-	-	-	3.1+	"
" " self-recognition,	-	-	-	3.2+	"

V.

Miscellaneous Questions.

As already indicated, the questions placed in this group proved less satisfactory than the others, and their results are chiefly valuable as warnings.

L. Mention some story that has made you weep—the most pathetic you can think of.

Replies on second questioning (90 cases): Thirty-nine (39) mention the death of some character in a novel; four

(4) misunderstandings ; three (3) hopeless self-sacrifice ; three (3) suffering for sin committed in ignorance ; two (2) disappointment of dearest hope in life ; seventeen (17) miscellaneous ; twenty (20) can select none ; two (2) never weep over books. The most interesting result of this table is the considerable number who specify cases not immediately connected with death.

M. Mention a funny story, incident, joke or scene in a book or play—the funniest you know, if possible

In response to this question many persons said they could not attempt to select the funniest story, because this was too dependent upon varying moods ; if they should select one, it would be merely the last funny story they heard. Many who did attempt to choose showed plainly that they mentioned the one freshest in memory, and no classification of them is possible.

N. What characters in history, fiction or life were ideals to you when growing up?

The answers to this question, so far as ideals are taken from history and fiction, is little more than an indication of what children read when most impressible. There is a decided and natural preference for ideals of the same sex, but a few respondents were careful to state that their ideals were of the other sex. Where the ideal is found in real life, the tendency is to idealise the less-known rather than the well-known, the teacher rather than the parents, and the old rather than the young.

O. If you had just one sermon to preach what would be your text?

Many subjects that were given in reply to this question could not be classified because so many sermons might be preached from them. Some hesitated to answer the question because they thought it might be asked to get an insight into individual character, and give the questioner a clue for later use. The first questioning was made during the Christmas holidays, when the financial stress was causing great suffering among the poor, and social questions were much discussed. This seems to have given color to the answers—at least in the second questioning answers of this kind were less numerous. Some of those who could not choose excused themselves by saying that their subjects would vary with their own meditations and could not be relied on as characteristic, and this is doubtless true of many who chose.

It is not difficult to find reasons for the failure of these questions. In *L* it was clearly a mistake to ask for the *most* pathetic story—thus introducing an unnecessary effort of comparison—and to specify the shedding of tears. If the request

had been given the simple form of *F* it might have been a tolerably good question. The same is true of *M*. Both *N* and *O* are ill-conceived in the matters for which they ask. If full answers had been obtained, only uncertain inferences could be drawn from them, and *O* is worst of all, in asking for something that a part at least of the respondents were disinclined to give.

So much for the results of this set of questions. On the questionnaire as a psychological method a point or two may yet be added. In the first place what tests are there, if any, for the exactness of the answers received? M. Binet, in his *Psychologie expérimentale*¹ after referring to the accord of the observations as a general control, mentions as tests applicable in special cases, simple experiments like requiring a respondent who has reported strength of memory for timbre to give the orchestration of a portion of a well-known piece of orchestral music, or one who has reported colored hearing to give at sufficiently separate times his photisms for a list of words. If the orchestration is well given, or if the double records of the list agree, the statements are probably true. The test of double questioning can be applied to any set of questions, in which it is possible, by lapse of time, or in any other way, to make the second questioning independent of the first. The amount of concordance in the two replies is a direct measure of the trustworthiness of the answer as a representation of what the respondent thinks on the matter in question; it does not of course show whether he is mistaken or not. A certain light is thrown on this last point by agreement or disagreement among the respondents, and (provided that answers may be fairly expected from all, as in the case of the questions above), by the number of those who find themselves unable to answer the question. If as many as fifteen in a hundred cannot tell how they force themselves to work when disinclined [*C* (2)], some uncertainty may be assumed in the answers of a good many who did answer. And if, as in *G*, two-thirds fail to answer, from unwillingness to reveal the causes of their anger, or for any other reason, it is highly probable that some at least of the other third were influenced in the extent of their confessions. When a questionnaire is sent out broadcast to the general public, this criterion cannot be used, though the total number of answers received to the simplest question of the set might serve in place of the total number of papers sent out.

The double questioning carried out in the case of the

¹P. 141 f., Paris, 1894.

questionnaire above, shows some wavering in the answers, even though the interval of two months was probably too short for complete forgetfulness; in most cases, however, the principal ratios of answers were not materially changed, and it is believed that they are substantially true. The inability of some respondents to tell how they recall a forgotten name, or how they set themselves to work when disinclined, shows that these questions approach the limit of casual introspection. The questions in Group IV met with the most ready and satisfactory answers. The respondents seemed always sure that they were making truthful reports, the recollections were interesting to them, and they were glad to make any contributions to a better understanding of the child.

In general, the questionnaire seems to the writer more valuable for the suggestions it gives the questioner than for its strictly scientific results. Each group of this study has suggested some problem for further investigation by experimental methods.

IX. THE MEMORY AFTER-IMAGE AND ATTENTION.

By ARTHUR H. DANIELS, PH. D.,

Instructor in Philosophy at the University of Illinois.

The memory after-image is familiar to all who busy themselves with psychology; and many others have casually noticed it in their ability to count clock strokes from the beginning, after a number have already passed, or to pick up the whole of a sentence whose beginning has been neglected. The experiments of this paper were undertaken to determine, if possible, the duration of images of this kind.

A prime difficulty is to separate the simple persistence of the image (due, perhaps, to the native retentiveness of the nervous substance) from its continuation in associative memory. It is possible to avoid the latter by experimenting with completely distracted attention; for what is received with complete inattention forms few associative bonds, or none at all, and runs its course of gradual extinction without interference. The state of the image during the fading out can be discovered by requiring the subject at a given signal to turn his full attention upon it and to endeavor to reproduce it. The degree of his success will indicate the condition of the image. It is probably impossible, under ordinary circumstances, to secure perfect distraction, and, even if it were secured, it might not pre-